433 highlands to the North China Plain, which
175 included southern Hopei.[12] At the end of the third century and the beginning of the fourth century Shansi became sparsely populated and Hopei's population was greatly reduced by the mass emigration of Han Chinese fleeing from nomad invasion, drought, and famine above the Yellow River.[13]

433 The building of the Grand Canal by the
175 Sui and the resulting realization of the agri-
312 cultural potential of the lower Yangtze basin under the T'ang Dynasty, reduced the North China Plain to a secondary economic position. However, although the Yangtze area contributed an overwhelming share of the empire's tax-grain revenues under the T'ang, the ruling house attempted to improve the productive possibilities of the home province of Shansi by undertaking numerous irrigation projects there as well as in Shensi to the west.[14]

631 After the location of the capital at
175 Peking near the second economic area of China
433 and the rebuilding of the Grand Canal by the Mongol rulers to bring to the political center

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12. Chi, op. cit., pp. 83-92.

13. Harold Wiens, China's March Toward the Tropics, Hamden, Conn., Shoe String Press, 1954, pp. 175-79.

14. Chi, op. cit., p. 42.

1:Stanford U. 5-4, 5 1956 AF12 North China
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631 the resources of the primary economic area,
175 China did not again experience a protracted
433 period of disunity until the Taiping Rebellion in the mid-nineteenth century. Though free from the risks and losses of ocean transport and less vulnerable to pirate raids along the coast, the inland waterway was increasingly costly to operate and maintain. This fact and the military danger of over-reliance of the capital on the South for grain induced the Yüan, Ming, and Ch'ing dynasties to attempt development of the Hui River area near Peking by the construction of additional irrigation systems. The productive results of the projects never came up to expectations, however, because the climate and soil of the area were unfavorable.[15]

441 During the same period in Shansi,
175 individual initiative developed numerous similar
[312] hydraulic works in the province. Such private
[471] activity was uncommon in China and seems to
[565] have been an outgrowth of the relatively high
[438] degree of commercial development in Shansi.[16] The rise of a merchant class in the province began with the Shansi people's participation in trade with the Mongol nomads at state-regulated markets, established on the frontier

15. Ibid., p. 144.
16. Ibid., p. 144.

1:Stanford U. S-4, 5 1956 AF12 North China AF12

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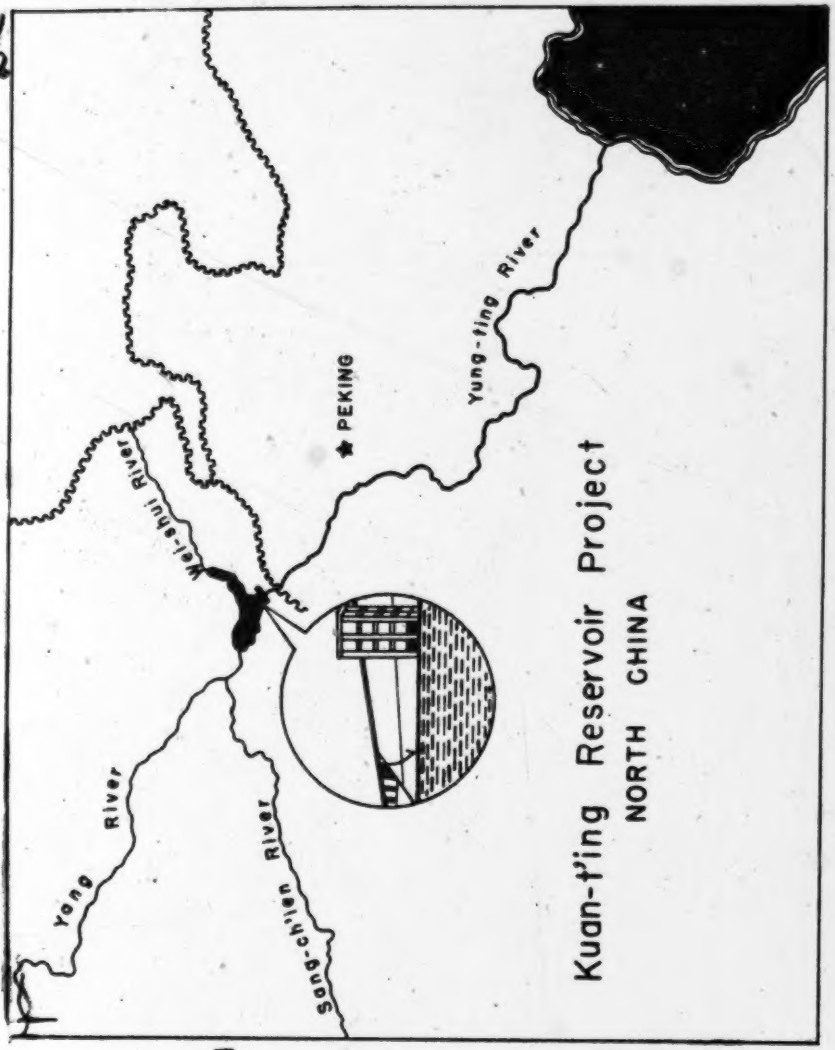
312



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1:Stanford U. S-4, 5 1956 AF12 North China
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226 principal offshore fishing areas, Chinwangtao and Sha-l'ei-t'ien. Many species of fish as well as shrimp, lobster, and crab are caught in large quantities in these fishing areas. Fresh-water fish are caught in the Ta-ch'ing River, the Pai River, and the Yung-ting River in Hopei Province. Fresh fish and shrimps are shipped to Peking and Tientsin for local consumption. Some are salted and dried for local consumption and for export.[22]

VI. IRRIGATION AND OTHER TECHNICAL IMPROVEMENTS

•312 In November 1949, the Communists drafted a plan to control the Yung-ting River, which often floods the surrounding countryside, and to develop the water resources in the valley of the Yung-ting. The key problem on the upper reaches of the river is soil conservation. Because so much soil is washed down from the mountains and hillsides and chokes the main tributaries of the river, a large afforestation program has been launched.[23] However, to solve the major problem of the troublesome

22. Pao-shu Chang, Chung-kuo Yü-yeh [China's Fishery], Taipei, 1954, pp. 27-34.

23. Economic Year Book 1954, Hong Kong Ching-chi Tao-pao she, 1954, p. 55.

1:Stanford U. S-4, 5 1956 AF12 North China
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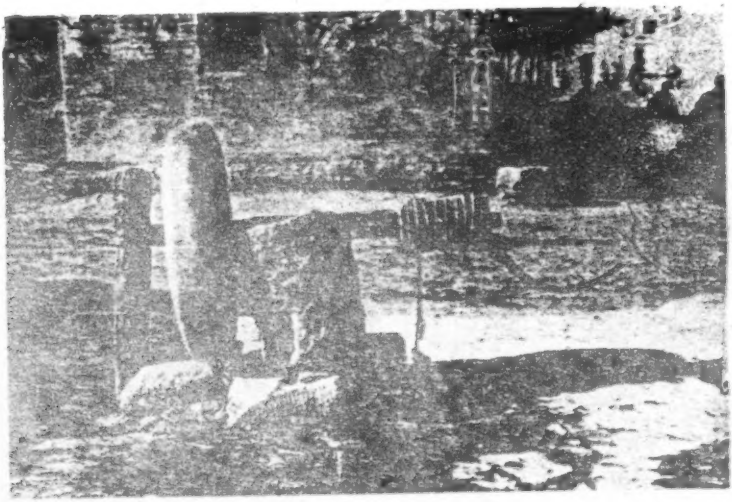
•312 Yung-ting, flood detention basins must be constructed on the middle courses. The Chinese Communist regime planned the construction of three flood detention basins; the reservoir at Kuan-ting, completed in 1954, is the most important. It serves to control flood waters, stores water for irrigation and for navigation, supplies drinking water to Peking, and is a source of power for the generation of electricity. If we estimate the benefits in irrigation alone, the reservoir, in addition to safeguarding some 800,000 shih-mou (133,333 acres) from the possibility of flood, has helped to increase the land under irrigation by some 2,000,000 shih-mou (333,333 acres).[24] The Fen River Flood Control System in Shansi Province, completed in August 1955, has increased the amount of irrigated farm land by 1,600,000 shih-mou (266,667 acres).[25]

312 Other factors which have tended to increase agricultural production are a number of technical improvements introduced in the cotton-growing regions of North China. The

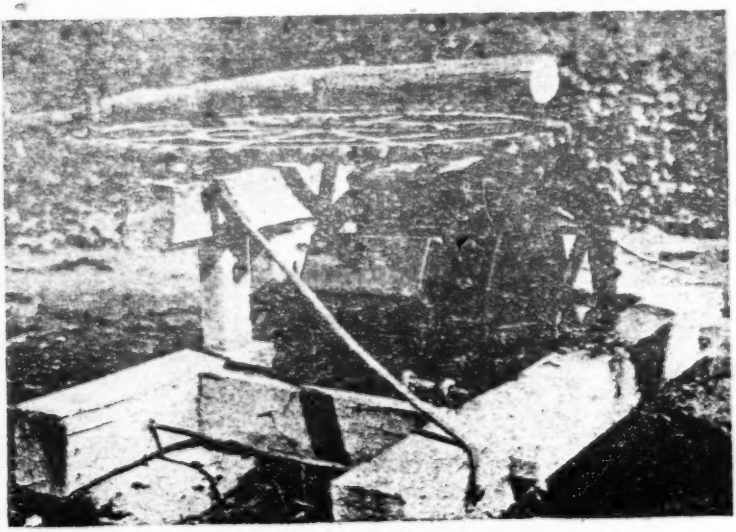
24. Ibid.

25. Hua-chiao Jih-pao [China Daily News], New York, Aug. 3, 1955.

312.



DOMESTIC WELL WINDLASS



PERSIAN WHEEL—LIFTING WATER FOR IRRIGATION

[p. 4(c)]

2: Gamble S-5 (1926-1933)1954 AF12 North China AF12

The militia were reported to be more effective than the police of the Bureau of Public Safety in protecting the villages. Being local volunteers, they were closer to the villages. In case of trouble the police would have to be summoned from the nearest branch office. The militia were especially helpful, during the winter period of farm unemployment, in protecting the villages from robbers and other trouble makers.

Bureau of Construction

In 1920 the head of the Bureau for Encouraging the People to Work was appointed by the Provincial Department of Industry from a slate of three nominated by the hsien magistrate. Four associates were also appointed. At that time the administrative expense of the Bureau was $122 per month. This expense was financed from one cash of the 3.5 cash received by the Merchants' Gild Association from the tax on each piece of native cloth sold in Ting Hsien. If this allocation was not sufficient, the difference was to be met from the one per cent of the land tax that was allocated to expenses. In 1922 the salary of the head of the bureau was $22 a month. The associates received $10 a month.

The Bureau for Encouraging the People to Work was changed to the Bureau of Industry in 1925. In the reforms of 1928 the Bureau of Industry became the Bureau of Construction. Its three sections were Agriculture, Construction, and General. In 1929 the administrative budget of the Bureau was $5,160. It was paid from the general hsien income. At that time the salary of the head of the bureau was $40 a month. The four experts were each paid $27 a month, the three section managers $24 a month, and the clerks $18 a month.

Reports on the work of the Bureau for Encouraging the People to Work stated that, from the establishment of the Bureau, a total of 25,802 wells had been dug and 3,311,220 trees of 17 different varieties had been planted. The China International Famine Relief's well survey report gave the number of wells dug from 1916 to 1930 as 26,103.[2]

The Bureau cooperated with the People's Factory by sending teachers to the villages to instruct the people how to make braid for straw hats. The braid was bought by the factory. In 1929 a subsidy of $156 was given to the factory, but in 1930 it had to be closed.

The Bureau of Construction required the people living along the

2. China International Famine Relief Commission, Series B #49, *Well Irrigation in West Hopei*, Preliminary Report, December, 1931.

2: Gamble S-5 (1926-1933)1954 AF12 North China AF12

 621 185 764

gods and the gate gods generally had been given up by the Chai Ch'eng families.

The Admire the Sages Society was organized by the school teachers in 1906 to encourage the people to imitate the good people of the past. In 1913 other educated people were included in the society membership. The Mi brothers and other prominent men gave lectures at the one or two meetings that were held every year. After 1921 meetings were held only every three years. The principal of the village school could call a meeting of the society, but it was completely inactive in 1931. 621 185

Promotion of Agriculture

From 1904 to 1908 Ting Hsien suffered from drought and the farmers had poor crops. Mr. Mi, the village head, and his assistant, Mr. Hsü, consulted with the other village elders as to how they might encourage the villagers to dig wells to provide water for irrigation. In 1906 eight wells were dug on village land as a demonstration, prizes were offered to encourage the poor farmers to dig wells, and arrangements were made whereby farmers, in need of money to finance the cost of a well, might borrow half the cost of the necessary materials. The loans were to be repaid after the harvest. Over ten years' time more than one hundred wells were dug. 621 185 312 731

Following the success of this program, the village elders encouraged the owners of small fields to dig cooperative wells where the individual fields were not large enough to warrant the digging of separate wells. There was great need for such cooperation as the study of a group of 3,763 fields belonging to 1,136 families in four other villages showed that only 7.9 per cent of the fields had 10 or more mu, and only 0.7 per cent had 25 or more mu.[2] A good well could irrigate from 25 to 30 mu.

The village elders provided that where land was held by a mortgagee he should pay his share of the cost of digging a cooperative well but he should be repaid by the mortgagor when he redeemed the property. Where land was held under lease the owners should pay the cost of the well, but should be reimbursed by increasing the rent. The village elders set up regulations for settling disagreements between mortgagors and mortgagees and between tenants and landlords over the cost of the wells and the increased rent.

Village regulations provided for the care of the public wells and the

2. See Chapter X.

2:Gamble S-5 (1926-1933) 1954 AF12 North China AF12

621 185 312 731 cooperative wells. The latter were to be looked after in turn by the various owners. Those responsible were required to report to the village office before they covered the wells to protect them from frost. If the well was damaged because of improper coverage the person responsible was required to repair the damage and pay a fine of five dollars. The village office was to keep a record of the owners of the cooperative wells and the time when each was to be responsible for the care of the well. The regulations required that after the wells had been covered for the winter and after they had been opened in the spring the village officers visit the fields and inspect the wells to determine whether they were being kept in proper condition. The well digging program received a further impetus from the drought of 1920–21.

In 1928 Chai Ch'eng had 390 wells, 96 for the domestic use of the 366 families and 294 for irrigation. A large proportion of the crop area of the village must have been irrigated, for the average area per well was 33 mu. Chai Ch'eng had the largest number of wells of any of the 62 villages in the Experimental District, four times the average number.

621 241 625 Watching the ripening crops to prevent theft before harvest time was another agricultural activity of the village. The watchmen were held responsible for any loss there might be through theft. This work had been done previously by the Green Crop Society, but in 1904 the village officers and elders adopted a series of regulations and employed eight men to watch the crops before the autumn harvest. Two men were assigned to each quarter of the compass. By 1913, when the crop watching was made part of the program of the Agriculture and Forestry Society, it was possible to protect the crops with only four watchers.

The wages of the crop watchers, which one report gave as 10 cents a day plus food, were met by contributions from the land owners. These were paid in kind and were graduated according to the amount of land held by each owner. The field report states that those with from 20 to 50 mu were to pay three gills (0.03 of a tou) of grain per mu; those with from 50 to 100 mu paid five gills per mu, while those who had more than 100 mu contributed seven gills per mu. If there was any surplus it apparently was kept as a special earmarked account rather than added to the general funds of the village.

In 1905, the year after the village engaged the crop watchers, regulations were adopted to cover the protection of trees planted in the village area. Two men were engaged to watch the trees and protect them

2: Gamble S-5 (1926-1933) 1954 AF 12 North China AF 12

CHAPTER XI

Wells and Irrigation

312 FORTY THOUSAND wells provided water for the irrigation of some 55 per cent of Ting Hsien's 1,425,000 mu of farm land. Another 20,000 wells inside the 453 villages furnished domestic water for the 67,865 village families. The average farm well irrigated some 20 mu. The average village well supplied water for 20 people.

121 312 Our well studies were sample and detailed surveys of the wells in the Experimental District in 1928 and the enumeration, in 1930, of all the wells in the hsien. The China International Famine Relief Commission also made a study of the Ting Hsien wells in 1930. This was part of a three hsien study made by the Commission at the request of General Hsü Yung-chang, then Governor of Hopei province. We have drawn on their Ting Hsien figures[1] to supplement our sample studies.

There was considerable difference between our detailed figures and theirs but there was general overall agreement. In the 62 villages in the Experimental District there were 25 villages where our count was larger, 36 where the Commission found more wells, and one village where their report was missing. The total difference for the area, however, was 140 wells and much of that difference might have been the result of additional wells dug during the two years between the two studies. There were similar differences in the figures for the six districts. In over half the districts our figures were the larger. The total difference for the hsien was 709 wells, 1.8 per cent. The Commission count was the larger.

312 The number of wells per village is shown in Table 72. Five villages had less than 10 wells for both irrigating and domestic use. One had 1,220 wells. The average was 131 wells per village. These were divided

1. China International Famine Relief Commission, Series B #49, *Well Irrigation in West Hopei*, Preliminary Report, December, 1931.

2: Gamble S-5 (1926-1933)1954 AF 12 North China AF 12

88 for irrigation and 43 for domestic use, or one domestic well for every two for irrigation. Counting both domestic and irrigating wells, there was an average of 0.87 wells per family. 312

Table 73 gives our count of the wells inside and outside the villages, the average number of mu of farm land per well, and the average number of families per well inside the villages. The average for the hsien was 35 mu per irrigating well and 3.5 families, or 20 persons, per domestic well. Only about half of the farm land was under irrigation. The number of mu watered by a sample of 471 wells in three villages is given in Table 74. The average was some 22 mu per well.

While the average number of persons per domestic well was 20, there was a wide range in the number actually served. Some supplied only a single family. Others furnished water for groups of families and supplied over 100 persons. The numbers using a sample of 183 wells are shown in Table 75.

In many courtyards either the space was not available or else no effort was made to separate the well and the latrine. In our sample of 183 domestic wells two-thirds of the wells were within 40 feet of the latrine and one in six was within 20 feet. However, because of the Chinese system of saving night soil and using it as fertilizer on the farm, there probably was little likelihood of contamination by seepage or surface drainage. (See Table 76.) 364 312

The average depth of the wells was some 21 feet. Some were less than 10 feet. None were over 45 feet deep. Fifty-nine per cent were between 15 and 25 feet, which meant moderate lift and moderate digging and operating costs. 312

The average depth of the water table was some 13 feet below the surface. In a few wells it was less than two feet below the ground. The deepest reported was between 38 and 40 feet. For two-thirds of the wells the depth of the water table was between six and 16 feet.

The average depth of water standing in the wells was some eight feet. While the measurements ranged from less than two feet to over 18 feet, in 80 per cent of the wells the water depth was between four and 10 feet.

The drought and famine of 1920–21 gave a great impetus to well digging. At that time the American Red Cross made a grant to assist in digging wells in Ting Hsien and five neighboring hsien. The Red Cross funds were for the labor cost. The workers had to be residents of the 731 312

2: Gamble S-5 (1926-1933) 1954 AF 12 North China AF 12

731 312 village where the well was dug and in need of relief. The land owners were to furnish the materials. The average labor cost was about $30.00 per well; the material cost about the same. Red Cross aid was given for 3,572 wells in the six hsien. Of these 463 were in Ting Hsien. Our investigators reported that, because families applying for aid had to be investigated and a tablet had to be attached to the well showing that it had been dug with Red Cross help, many families were unwilling to accept the offered help. However, the offer of foreign aid stimulated the Industrial Bureau of the hsien government to offer similar assistance to those who wanted to dig wells. At that time the Industrial Bureau imported some well digging machines that expedited the work, after the local workers had learned the necessary technique. Later Mr. Mi Chu-wu, the village head of Chai Ch'eng, bought a machine for use in that area and went to the neighboring villages to urge the farmers to dig additional wells. Residents of Chai Ch'eng paid $7.00 for the use of the machine. Other villages paid $12.00. In 1923 the Industrial Bureau sent two of the Chai Ch'eng well diggers to Ts'ao Chou Fu in Shantung to teach the people there the new technique.

How the impetus given to well digging by the drought of 1920–21 continued during the next decade is indicated by the C.I.F.R.C. figures showing when the irrigating wells were dug.

	Number	*Per Cent*
Before 1915	13,876	34.7
1916–1920	5,778	14.5
1921–1925	9,771	24.4
1926–1930	10,554	26.8
	39,979	100.0

More than 50 per cent were dug after 1920.

312 In a study of the wells in three villages we found that 60 per cent of the 471 irrigating wells were dug from 1921 to 1928 and another 23 per cent from 1912 to 1920. Twenty-five wells, 5.2 per cent, were reported to have been dug before 1894. The oldest one was said to date from the reign of the Emperor Chia Ch'ing (1797–1820).

It was a very different story for the 183 domestic wells. Only 14 of those, 7.7 per cent, had been dug after 1920. Forty-four, 24 per cent, were dug between 1912 and 1920. Fifty-six, 31 per cent, were at least thirty-five years old, dug before 1894. Five were said to have been dug before 1796. The oldest was reported to be more than 265 years old, dug

2: Gamble S-5 (1926-1933)1954 AF 12 North China AF 12

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during the reign of Shun Chih (1644–61). At least one well was reported to have been dug during the reign of each of the Ch'ing emperors except Yung Cheng (1723–1735).

Eighty eight per cent of the Ting Hsien wells were curbed with brick, 8 per cent with earth, and 4 per cent with other material. When a new well that was to be brick curbed was some 10 feet deep, a circular willow wheel, several inches in width and up to 10 feet in diameter, depending on the size of the well, was hung by heavy ropes from timbers placed across the mouth of the well. The brick curbing was built up on this willow wheel. As the well was deepened the wheel and bricks were gradually lowered so that when the well was finished it was curbed from top to bottom.

Almost 55 per cent of the wells had a bottom diameter of from seven to ten feet; most of the others were between four and seven feet. There were a few smaller wells and a very few larger.

The top diameter of the wells, regularly considerably smaller than the bottom, was largely determined by whether the water was to be lifted by an animal driven Persian wheel or by a one, two, or three wheel hand windlass. Sixty-one per cent of the wells had a top diameter of from four to six feet. Almost all the others were between two and four feet. The wells were generally stone capped.

Our investigators reported that in 1928 it cost about $80 to dig a three wheel well, $55 for a two wheel well, and $38 for a one wheel well. For the three wheel well the expenses were $5.00 for the wooden wheel, $40 for some 3,500 bricks, $6.00 for the stone mouth, and other expenses about $30. The labor amounted to about 50 days' work. For the two wheel wells the wood wheel cost $3.50, the 2,800 bricks some $34. The one wheel well required only some 1,700 bricks. The C.I.F.R.C. study reported the average cost of the irrigating wells as $65.70, about $3.00 per foot of depth. Our study of 471 irrigation wells gave 54 days' work as the average digging time. For domestic wells inside the villages the average was 33 days' work.

A hand windlass, made of elm wood, cost from $1.50 to $2.00. The water baskets cost 55 cents each. The tripod for a one wheel well cost from $1.00 to $2.00, for a two wheel well from $1.20 to $2.00, and for a three wheel well from $2.00 to $3.00. A level pole, used on shallow wells, cost from $1.70 to $2.60. For the Persian wheels used to lift water by animal power we had a variety of quotations varying all the way

2: Gamble S-5 (1926-1933) 1954 AF 12 North China AF 12

312 from $50 to $150. The length of lift and the number of metal buckets in the lifting chain would naturally be a large factor.

Our field workers reported that a Persian wheel could irrigate from three to three and a half mu per day, three hand wheels from four to five mu, two hand wheels from three and a half to four mu, and one hand wheel from one to one and a half mu. The C.I.F.R.C. estimat was Persian wheel five mu per day, one windlass three mu, and level p le three mu per day.

The estimated daily operating cost was level pole 72 cents, windlass 59 cents, and Persian wheel $1.11. The average cost per mu was level pole 24 cents, windlass 19 cents, and Persian wheel 22 cents. Very little if any of thes costs would represent cash outlay for the farmer as the level pole and windlass irrigating was regularly done by hand by members of the family and the family cow or donkey could run the Persian wheel without adding very much to the farm budget.

The C.I.F.R.C. engineers estimated that the standard well seven to eight feet in diameter with some six feet of water would produce enough water to irrigate more than 16 mu. The larger wells, if they were drawing from loose soil, could furnish enough water for from 30 to 40 mu, occasionally for more than 50 mu. The smaller wells would irrigate some 10 mu. In our study of 471 wells in three villages the average was 22 mu per well with one-quarter providing water for less than 15 mu and another quarter for from 30 to 55 mu. The details are given in Table 74.

If a standard well produced enough water to irrigate more than 16 mu of land, and the average size of the fields owned by a sample 200 families was 4.2 mu, and 68.9 per cent of the fields contained less than 5 mu and 92.8 per cent less than 10 mu, one wonders what arrangements, if any, were made for sharing the available water with the owners of adjacent fields. We know that in some instances the owners of small plots joined in digging community wells. Experience seemed to show, however, that this could lead to difficulties, for in some reports on the activities of the village government it was noted that one of the duties of the village elders was to see that the joint owners took their turns in looking after the wells and that the wells were properly protected against freezing and other winter damage. No figures were available giving any estimate of the amount of joint digging or the sharing of any surplus water.

2: Gamble S-5 (1926-1933) 1954 AF 12 North China AF 12

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It was estimated that the 40,000 irrigation wells could furnish water for some 55 per cent of the Ting Hsien farm area. To provide for the remaining acreage, if it were all suitable for irrigation, would require at least another 30,000 wells. Many of these apparently could be advantageously dug, for all the reports showed that irrigated land was generally worth more than twice the unirrigated land and that the added crop value from 16 mu would ordinarily be enough to pay for the well in about one year. Even so, most of the families would need help in financing a capital improvement of that size.

TABLE 72. WELLS PER VILLAGE, 1930

Wells	*Villages*	*Per Cent*	*Wells*	*Villages*	*Per Cent*
1–9	5	1.1	150–199	36	8.0
10–19	33	7.3	200–299	37	8.2
20–39	77	17.0	300–399	32	7.1
40–59	65	14.3	400–499	11	2.4
60–79	48	10.6	500–599	9	2.0
80–99	30	6.6	600 and over	5	1.1
100–149	65	14.3	Total	453	100.0

TABLE 73. WELLS PER DISTRICT

District	*Inside Village*	*Families Per Well*	*Outside Village*	*Mu per Well*	*Total Wells*
1	2,484	2.6	2,918	49	5,402
2	2,195	3.7	3,090	59	5,285
3	2,815	5.8	5,883	58	8,698
4	3,132	5.0	11,834	27	14,966
5	3,057	2.6	5,453	27	8,510
6	5,729	2.3	10,621	25	16,350
	19,412		39,799		59,211
Average	43	3.5	88	35	131

2: Gamble S-5 (1926-1933) 1954 AF 12 North China AF 12

312 TABLE 74. AMOUNT OF LAND IRRIGATED BY 471 WELLS IN THREE VILLAGES

Mu	*Wells*	*Per Cent*	*Mu*	*Wells*	*Per Cent*
Under 5	23	4.9	30–39	108	22.9
5–9	50	10.6	40–49	15	3.2
10–19	114	24.2	50 and over	2	0.4
20–29	159	33.8	Total	471	100.0

TABLE 75. NUMBER OF PEOPLE DRAWING DOMESTIC WATER FROM WELLS

Persons	*Wells*	*Persons*	*Wells*
Under 10	21	50–59	6
10–19	52	60–69	2
20–29	47	100 and over	1
30–39	36	No data	6
40–49	12	Total	183

TABLE 76. DISTANCE OF WELLS FROM LATRINES

Distance	*Wells*	*Distance*	*Wells*
Under 10 ft.	7	60–69	12
10–19	22	70–79	3
20–29	41	80–89	3
30–39	40	100 and over	4
40–49	18	No data	18
50–59	15	Total	183

2: Gamble S-5 (1926-1933)1954 AF12 North China AF12

The growing season for the area, the number of days with mean temperature continuously above 43°, was some 226 to 230 days, or about March 25 to November 10.

For the years 1927–1929 there was an average of 59 days per year with some precipitation, 10 days with snow and 49 days with rain. There was hail on two days in the three years. The average yearly precipitation was 485.3 millimeters or 19.1 inches. The annual totals varied from 15.5 to 24.2 inches.

Almost 70 per cent of the average rainfall came in the months of July and August and 84 per cent in the four months from June through September. For all three years there was no precipitation in February and either October or November had no rain. For five months of the year the average precipitation was less than one-third of an inch. Only in the four months from June through September was the average over one inch per month.

Rainfall statistics were secured for the years from 1914 to 1926, but unfortunately were incomplete. However, if we use the available figures, omitting from the averages the individual months with no report, the sum of the monthly averages was 412.1 millimeters (16.2 inches), some 15 per cent less than the 1927–1929 average.

The figures for the four months from June through September show some very interesting variations. The average was 14.1 inches, but for the individual years the range was from 0.97 inches in 1921 and 2.5 inches in 1920 to 30.2 inches in 1917 and 32.6 inches in 1924. The year by year variation in the June–September rainfall is shown in Figure 3. The years 1917 and 1924 were flood years. For July, 1924, the rainfall was 24.6 inches. Less than 1.5 inches fell during the preceding six months. In 1917 the July rainfall was 16.1 inches. Both 1920 and 1921 were famine years. In July, 1921, the recorded rainfall was only 1.4 millimeters and the June–September total was only 24.6 millimeters. The drought was so acute in North China that the American Red Cross sent relief funds to help carry the people through to the next harvest. As part of the relief program in Ting Hsien, surfaced roads were built from the railroad station to the city and inside the city wall. Four hundred and sixty-three wells were dug with Red Cross assistance.[2]

The low average rainfall of less than 20 inches and its uneven distribu-

2. China International Famine Relief Commission, Series B #49, *Well Irrigation in West Hopei*, Preliminary Report, December, 1931.

2:Gamble S-5 (1926-1933) 1954 AF12 North China AF12

312 tion throughout the growing season made irrigation necessary for the growing of good crops in ordinary years and as insurance for at least minimum crops in drought years. Ground water was available fairly near the surface and in reasonably sufficient amounts. The water table varied from two to 40 feet below the surface, averaging about 14 feet. How this was developed for irrigation and domestic use is reported in Chapter XI.

133 Ting Hsien is part of the east China alluvial coastal plain, so there are no natural hills in the area. Dykes had been built to control the rivers and a few mounds had been built up to a height of some 30 or 40 feet. Local tradition says that one of these was piled up by the army to make the enemy believe it was a supply of food. Another appeared to be a large grave mound with a long entrance tunnel. The average elevation is about 100 feet above sea level.

134 The soil of the area is generally deep and fine textured, calcareous and somewhat saline. Along the river beds there usually is a considerable area covered with coarse sand. Elsewhere the soil is sandy loam, loam, and some clay.

133 The area is drained by streams that rise to the west, cross Ting Hsien in an easterly direction, and later join the Hu T'o Ho in An-kuo Hsien. That stream flows north to the Pai Ho, which enters the sea near Tientsin. The chief rivers are the T'ang, which runs about three miles north of Tinghsien city, and the Sha, which runs about eight miles to the south. The Meng Liang is a smaller watercourse that runs southeast between the two and joins the Sha in An-kuo Hsien. One branch of the Meng Liang comes up to the southeast corner of the city wall, where it connects with the old, now dry, city moat, which in one of the old records was described as 100 feet wide and 20 feet deep.

The rivers are generally swollen in summer time with the heavy rains, but in winter most of the watercourses are dry. The large Black Dragon Spring in the northwest part of the hsien insures a year round flow in the T'ang. The spring supplies enough water to irrigate some 2,090 mu of rice fields before it reaches the T'ang. There also used to be a large White Dragon Spring, but it was flooded and destroyed in the flood of 1801. The hsien history says that during the reign of Hsien Feng the Black Dragon Spring failed. The dragon king was said to have moved to a village in Ch'ing-yuan Hsien, Paoting, some 35 miles north, because too many people came to the pool to get fish. Later on, the elders of one of the villages near the spring, probably Tung Nan Ts'un, sent a

4: Burgess E-4.5 (1926-1927) 1928 AF12 North China AF12

envy and hostility of the Wenchow traders, and suffer insult and injury, we have no adequate means of redress. Mercantile firms, if each looks only after its own interests, will experience disgrace and loss, the natural outcome of isolated and individual resistance. It is this which imposes on us the duty of establishing a club.[1]

In this study some evidence was found that some of the guilds in which membership was formerly confined to those of one district may have originated in this way. The following description given by a representative of the Tailors Guild would bear out this theory:

This profession, we are told, originated in the South. The tailors who first came to Peking found it very difficult to find a lodging-place; so they called a meeting of their fellow-tradesmen to discuss the difficulty. The first proposal was that one per cent of everyone's salary should be given towards the organization of the guild and the building of a guild headquarters. The fund asked proved insufficient, so customers were asked for contributions. With these funds the Guild House was established during the Ming dynasty.

The Actors, in like manner, originally came from Anhui, and it may be possible that the Actors Club originated in close identity with the Actors Provincial Club, although the available material does not furnish any evidence along this line. The Water Carriers in Peking are almost entirely from Shantung, and the Bankers are invariably from Shansi.

(4) Another explanation of the origin of the guild may be found in the study of the inherent reasons for guild organization present both in contemporary Chinese society and in the ancient social structure. From of old the officials have levied taxes of one kind or another on commercial trans-

[1] Morse, *op. cit.*, p. 44.

5: Tao E-5 (1926-1927) 1928 AF12 North China AF12

Next to wage-earnings, presents and gifts figured prominently in the income, their nature having been discussed in a previous chapter.[1] It should be borne in mind that meals taken free of charge by members at the homes of relatives or friends were considered as presents, for it has been a practice in some families to have their children board with their relatives for a sufficiently long period in the year. Meals so supplied are in fact relief in the form of presents. Relief formed but an insignificant part, it being less than one per cent of the total average income per family. Rent, as a rule, does not constitute a regular source of income for these families, though three of them had received incomes either from land or from rickshas.

As shown in Table 9, the total average amount of expenditure per family in six months was $101.45. The percentage of this sum was distributed thus: food, 71.2 per cent; fuel, light and water, 11.3 per cent; house rent, 7.5 per cent; clothing, 6.8 per cent; miscellaneous, 3.1 per cent.

Little need be discussed here on food, clothing and house rent, as they will be more fully treated in subsequent chapters. That fuel, light and water should have absorbed more than 11 per cent of the total average expense per family and become the next biggest item after food is certainly striking and calls for consideration.

Water alone formed almost one per cent of the total average expense and its quantity consumed per capita per day was on the average about 7.3 litres. In Peking, the majority of families has to buy water from carriers who make it a monopoly to bring it from the well or the water main to the consumer. It is a usual practice for each family to pay a lump sum every month to the carrier who supplies to it a specified quantity of water every day. For a family of two, a charge of fifteen cents per month is generally made and the water supplied to it is about 420 litres. The price of water must be considered high in Peking. As every drop of water has to be transported by human labour from the

[1] See supra pp. 20-22

5: Tao E-5 (1926-1927) 1928 AF12 North China AF12

well to the consumer's home, its price increases with the rising cost of living of the carrier. Consequently, families with low earnings are compelled to reduce the use of water to its minimum. The effect of this upon their cleanliness and health cannot but be baneful.

More than 10 per cent of the total average expense, that is $10.54, was expended on fuel and light. Of this amount, the average percentages for the different items were distributed thus: coal balls, 67.1 per cent; kerosene, 17.2 per cent; charcoal, 11.6 per cent; wood, coal and matches, 4.2 per cent. The coal ball forms the chief fuel in Peking households. It is made by mixing coal dust and earth with water and hundreds of shops are engaged in its making and sale. As the coal ball formed more than 67 per cent of all expenses on fuel and light combined, its expense and quantity consumed may here be examined.

Table 10.—Average Expenses for and Quantity of Coal Balls per Family in 6 Months

Income group	Number of families	Average Expenses	Average Quantity *(in kilograms)*
Under $70	3	$5.90	505
$70 and under $110...	28	6.51	557
$110 and under $150...	14	8.10	693
$150 and under $190...	3	8.75	749
All incomes.....	48	7.07	605

It will be observed from Table 10 that the consumption of coal balls per family per month amounted to about 100 kilograms. This figure, low as it is when compared with that for the working family of other countries,[1] must be considered as sufficiently high for the Peking family. However, some discount must still be made from this figure, because the accounts of our families were kept chiefly in the winter months, during which time the consumption of coal balls must have been particularly great. In the

[1] Cf., for instance, five tons of coal and 26,000 cubic feet of gas which are allowed as a fair standard per year for an American labourer's family. *Workingmen's Standard of Living in Philadelphia* 1919, New York. p. 51.

7: Gamble S-5 (1926-1927) 1933 AF12 North China AF12

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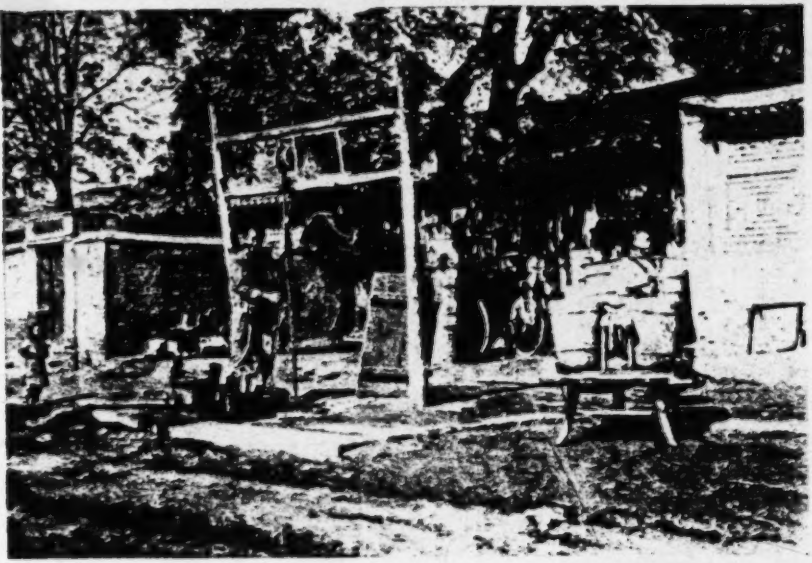

ROADSIDE WELL

WATER WHEELBARROW

Water for most Peiping homes is distributed in wheelbarrows from wells, although water under pressure is available from the mains of the Peiping Water Company.

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7: Gamble S-5 (1926-1927) 1933 AF12 North China AF12

WATER

"Peiping's running water runs around in carts," is a local saying, as the water supply of most families is brought to their gates in large wooden wheelbarrows and is then carried into the houses in buckets. Water under pressure is available from the mains of the Peiping Water Company in a large part of the city, but the cost of plumbing puts it beyond the reach of the poorer families. The distribution of water is evidently a monopoly firmly held by the water carriers' gild, most of whom were originally natives of Shantung province. It is reported that the gild has a membership of some 2,500 men. In many cases, the privilege of supplying water to the people of a given district is the property of one man. He can lease or sell the privilege and even leave it to his children.[17] One of the families included in our study received $17 a month for the rent of a water district.

Most of the water is drawn from surface wells, though some of the carriers get their supply from the hydrants of the water company. The retail price of water was 1 cent for two bucketfuls, but many of the regular users contracted for their supply on a monthly basis. The amount delivered to some families paying 15 cents a month was approximately 420 liters per month.[18] For many of our families, the price of water was fixed in terms of copper, rather than silver. There were regular monthly payments of 30, 50, 60, 70, 75, 90, 120, and 180 coppers. Other families, if they paid a regular monthly minimum, must have purchased varying additional

[17] No. 17. [18] No. 39.

7: Gamble S-5 (1926-1927) 1933 AF12 North China AF12

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435 amounts, as there was considerable fluctuation in the monthly totals.

*511 The accounts of 29 families showed no expenditure for
312 water. Twenty of these were living outside the city walls. They drew their water from the public well and carried it themselves. For two families, water was included in the rent; one owned a well; and one drew its supply from water paid for by friends or relatives. All but five of the families reporting no expenditure for water were receiving less than $25 a month.

*511 The average expenditure per family for the different income groups increased regularly from 7 cents a month, 82 cents a year, to $1.30 a month, or $15.85 a year. Only 23 families reported the expenditure of $1 or more a month. The maximum was $33 for the year. Some months the expenditure of that family for water ran as high as $4. From the figures in Table 31, it seems evident that the average expenditure for water is less than $2.50 a year when the family income is less than $25 a month. It is over $4 for families with more than $40 a month; between $6 and $8 for the families whose incomes are between $60 and $125 a month; and over $10 a year for families with incomes of more than $125 a month.

For more than half the income groups, the expenditure for water was between 7.1 and 9 per cent of the expenditure for heat, light, and water. It varied from 1 per cent to one-third of 1 per cent of the total family expenditure, the proportion fluctuating somewhat, but generally decreasing as the family income increased.

The monthly averages of the different income groups show a slight seasonal variation in the expenditure for water. Virtually all are below the average for the first